

## KEYNOTE SPEAKER

### Probiotic *Lactobacillus casei* Zhang, its prevention effect for colon carcinoma

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#### Abstract

CRC is one of most common causes of cancer mortality in the world. Recent studies have provided new evidence that various gastrointestinal bacteria and inflammatory microbial dysbiosis promoted the development of colon cancer. Here we identify the intestinal microbiota as a multi-target of host genes that impacts the progression of inflammation-associated CRC. We observed that either probiotic *L. casei* Zhang ( $4 \times 10^9$  cfu/d) or Vitamin K2 (MK-7, 50mg/kg) intervention significantly reduced the number of intestinal tumors in mice compared to AOM/DSS model group ( $p < 0.05$ ). Furthermore, serum adiponectin levels were significantly improved by the treatment of *L. casei* Zhang or Vitamin K2 ( $p < 0.05$ ). But the osteocalcin level was only up-regulated by *L. casei* Zhang administration. Though both two treatments are adiponectin-targeted, the mechanisms of these treatments involved different signaling ways. The anticancer effect of probiotic treatment contained a hepatic CLCN3-NF-kappaB and an intestinal Claudin15-CLIC4 signaling ways, while vitamin K2 effect involved a hepatic VDR-phospho-AMPK signaling way. The third generation sequencing and analysis of feces DNA revealed *Helicobacter apodemus*, *Helicobacter mesocricetorum*, *Allobaculum stercoricanis* and *Adlercreutzia equolifaciens* were down-regulated by the treatment of *L. casei* Zhang and Vitamin K2 compared to cancer group ( $p < 0.05$ ). Moreover, the significant higher level of short chain fatty acids-producing *Clostridium leptum* in MK-7 intake mice, but not significant from probiotic treated mice compared to cancer group, might play an important role in cancer prevention. Besides, MK-7 significantly reduced the abundance of infective *Parasutterella excrementihominis* compared to cancer group ( $p < 0.05$ ). Finally, we concluded that *L. casei* Zhang and Vitamink2 could modulate gut microbiota composition and reduce colonic tumor development in mice.

#### Biography

Heping ZHANG, male, PhD, professor, PhD advisor, born on 26 February 1965. The research team led by Professor Zhang was selected by the Program for Innovative Research and Development of the Ministry of Education in 2009. Professor Zhang was awarded the Distinguished Young Scientists of National Science Funds, China, in 2010. In 2012, he was appointed as a chair professor of the Cheung Kong Scholars Program (MoE, China). In 2013, he was chosen for the National Talents Project of the New Century National Hundred, Thousand and Ten Thousand No. 130028), and was granted the title of 'Young Expert with Outstanding Contributions'. In 2014, his research team, Innovative Research Team of Lactic Acid Bacteria and Fermented Dairy Products, was assigned the key area of innovation by the Ministry of Science and Technology.

He is currently the Director of the Key Laboratory of Dairy Biotechnology and Engineering of the Ministry of Education, Inner Mongolia Agricultural University, as well as the Dairy Product Processing Laboratory of National Dairy Industry and Technology System, P. R. China